

MINISTRY OF AGRICULTURE, FISHERIES AND FOOD
CEFAS LABORATORY, LOWESTOFT, SUFFOLK, ENGLAND

1997 RESEARCH VESSEL PROGRAMME

REPORT ~~PROGRAMME~~: RV CORYSTES: CRUISE 1

STAFF: A P Scott (SIC)
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E Vermeirssen (MAFF external contract)
C Stewart (Casual)

DURATION: 18-27 January 1997

LOCALITY: Southern North Sea

AIMS:

1. Collection of blood, sperm and testis samples from male plaice caught on and off the main spawning areas of the North Sea - to determine: a) whether sperm production and sex steroid levels are affected by the presence of ripe spawning females; b) whether sex steroid levels are linked to body size; c) whether sex steroid levels are affected by environmental xenoestrogens. This is a continuation of studies carried out on *Corystes* 1/94 and *Corystes* 1/96.
2. Concomitant plankton net collections of fertilised plaice eggs to assess the intensity of spawning in the sampling areas (Bromley).
3. Concomitant collection of plasma samples from male dabs.
4. Collection of pools of blood plasma from female plaice (stage IV and stage V/VI to be collected separately) for mass spectrometry studies.
5. Collection of plaice pituitaries for purification of gonadotrophins.
6. Collection of plaice brain hypothalami for possible purification of gonadotrophin-releasing hormones by Dr Sherwood of the University of Victoria in Canada.
7. Experiments in deck tanks to determine the time course in the drop in sex steroid levels which has been found in captured male plaice.
8. Collection of live male plaice for return to the laboratory.

NARRATIVE:

RV CORYSTES left Lowestoft at 1700 h on Saturday, January 18, 1997 and steamed to near Smiths Knoll to release tagged plaice for J Metcalfe.

Jan 19: Fishing was commenced at position 20 (Fig. 1) at 0800 h. No male plaice were found in a half hour beam trawl at either this position or at the next eastward position 15S. Males were first encountered at position 16S. These were sampled and a tin tow carried out. Many males, with a large size range, were found at position

17S. A series of tows was therefore carried out at this same site during the rest of the day (up until 2100 h) in order to collect up to 100 males. Tin tow netting was also carried out.

Jan 20: From 0800 until 2040 h, beam trawling and tin tow netting was carried out at positions 14S, 18S, 6S, 1S and 19S. No males were present at positions 1S and 19S.

Jan 21: From 0800 until 2335 h, beam trawling and tin tow netting was carried out at positions 24S, 23S, 21S and 10S. A new site (between 24S and 23S) was investigated but considered to be too rough to be fished. There were no male plaice in the first haul at site 23S and so this was not fished again. There were some males at the other sites, but these had to be trawled several times in order to achieve the requisite number of fish ($n = 20$).

Jan 22: From 0800 until 2042 h, beam trawling and tin tow netting was carried out at positions 9S, 13S, 2S and 27S. A repeat tin tow netting was also carried out at position 17S.

Jan 23: Having completed three traverses of the spawning grounds in the Southern Bight, the ship steamed overnight to the area where sampling had been carried out in January 1996 (north east of the Cleaver Bank; RV *Corystes* 1(a)/96). From 0800 until 2130 h, beam trawling and tin tow netting was carried out at positions 233N, 1N, 2N, 3N and 4N.

Jan 24: From 0800 until 1914 h, beam trawling and tin tow netting was carried out at positions 5N, 6N and 8N. This completed the north east traverse.

Jan 25: From 0800 until 2217 h, beam trawling and tin tow netting was carried out at positions 441N, 338N, 330N, 333N, 177N and 179N. No male plaice were caught at positions 441N, 338N and 177N. Several short trawls (15 min) were made at position 179N in order to collect live fish.

Jan 26: From 0800 until 1530 h, beam trawling and tin tow netting was carried out at positions 201N and 198N. The ship then returned to Markham's Hole (179N) specifically to catch live fish. Fishing stopped at 2040 h.

Jan 27: RV *Corystes* returned to port about midday. The weather was fine throughout the cruise.

RESULTS:

Aim 1: Blood, sperm and testis samples were collected from 570 male plaice at the 'clear tow' positions shown in Fig. 1. These positions were along four courses which transected three of the major spawning areas in the North Sea (Fig. 2). Some positions did not yield any male plaice. Some yielded a full sample ($n=20$) in one half-hour tow. Others had to be fished several times. A sample of 100 males was collected from position 17S (in the Southern Bight). The catch data are summarised in Table 1. All male plaice were weighed and measured. A blood sample was taken and the plasma frozen for subsequent analysis of steroid levels. Sperm was stripped by hand

and collected in plastic pipettes. A small amount of the sperm was sucked up in a capillary tube, spun in a haematocrit centrifuge for 30 min and the packed cell volume (top-most band) recorded. The plastic pipettes were then frozen so that they could be weighed back at the laboratory. The testes were dissected out of the males and frozen in plastic vials so that they could also be weighed back at the laboratory. Preliminary data are shown in Table 2.

Aim 2: Plaice eggs were sampled using a 53cm diameter encased body tin tow net fitted with a 20cm diameter aperture, conical nose cone. The net was 60 mesh per inch, nylon plankton netting and the end bag was of similar specification. Catch data are shown in Table 3. Towing parameters (depth, duration, temperature etc) are shown in Table 4.

Aim 3: Male dab plasma was collected from some of the positions. Plasma was collected from 94 male and female flounders.

Aim 4: Pools of plasma (total > 100 ml) were collected from spawning female plaice.

Aims 5 and 6: Due to damage to one of the liquid nitrogen containers (which resulted in the nitrogen evaporating rapidly) pituitaries and brains were not collected.

Aim 7: Three experiments were carried out in the deck tanks on male plaice.

Aim 8: Over one hundred male and female plaice were returned alive to the laboratory.

A P Scott
27 February 1997

SEEN IN DRAFT: D MacDarren (Master)
M Reynolds (Fishing Skipper)

INITIALLED: G P A

DISTRIBUTION:

Basic list+
A P Scott (SIC)
P R Witthames
R J Turner
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L N Greenwood
C Stewart
E Vermeirssen

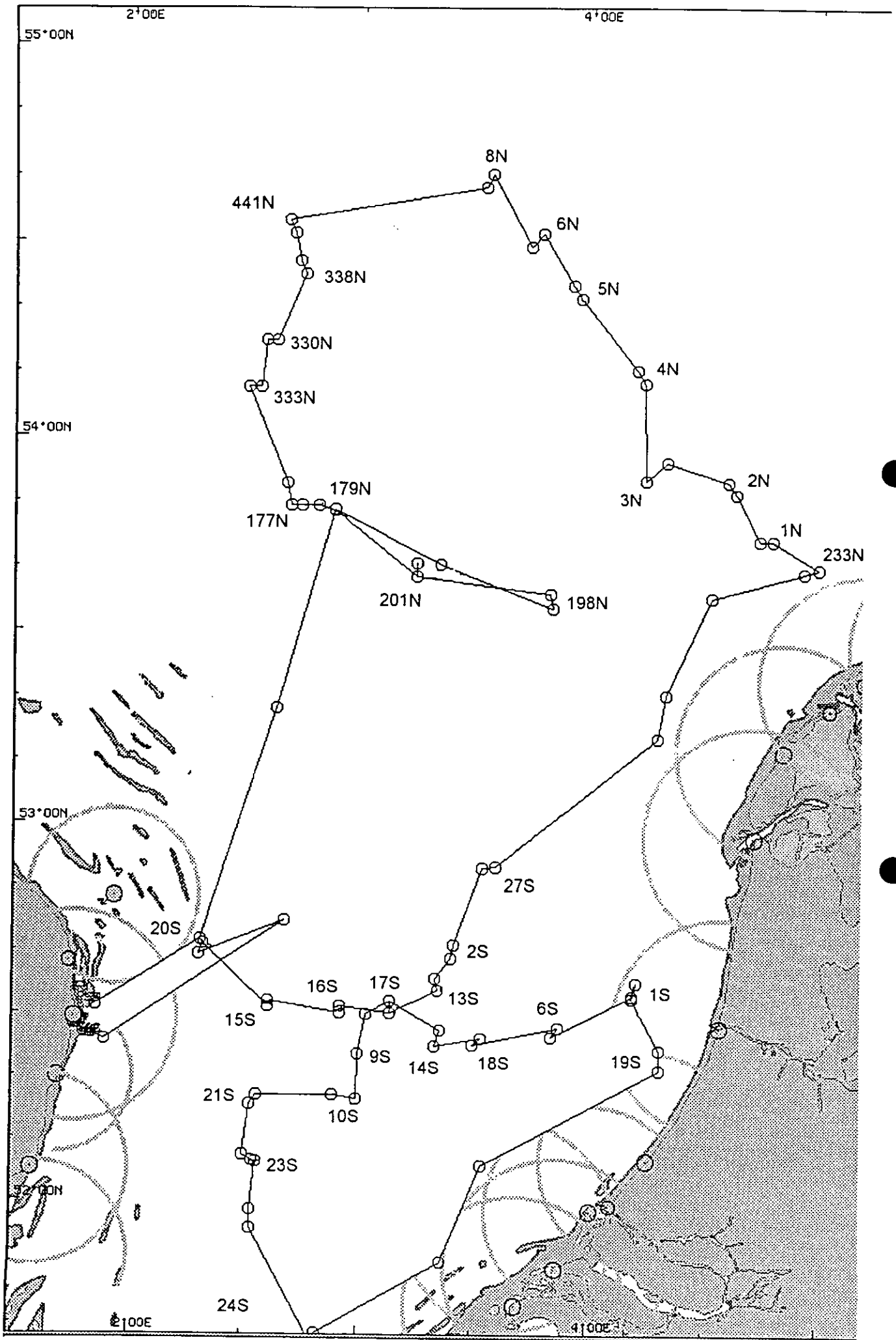


Fig. 1 Clear tow positions where beam-trawling was carried out on Corystes 1b/97

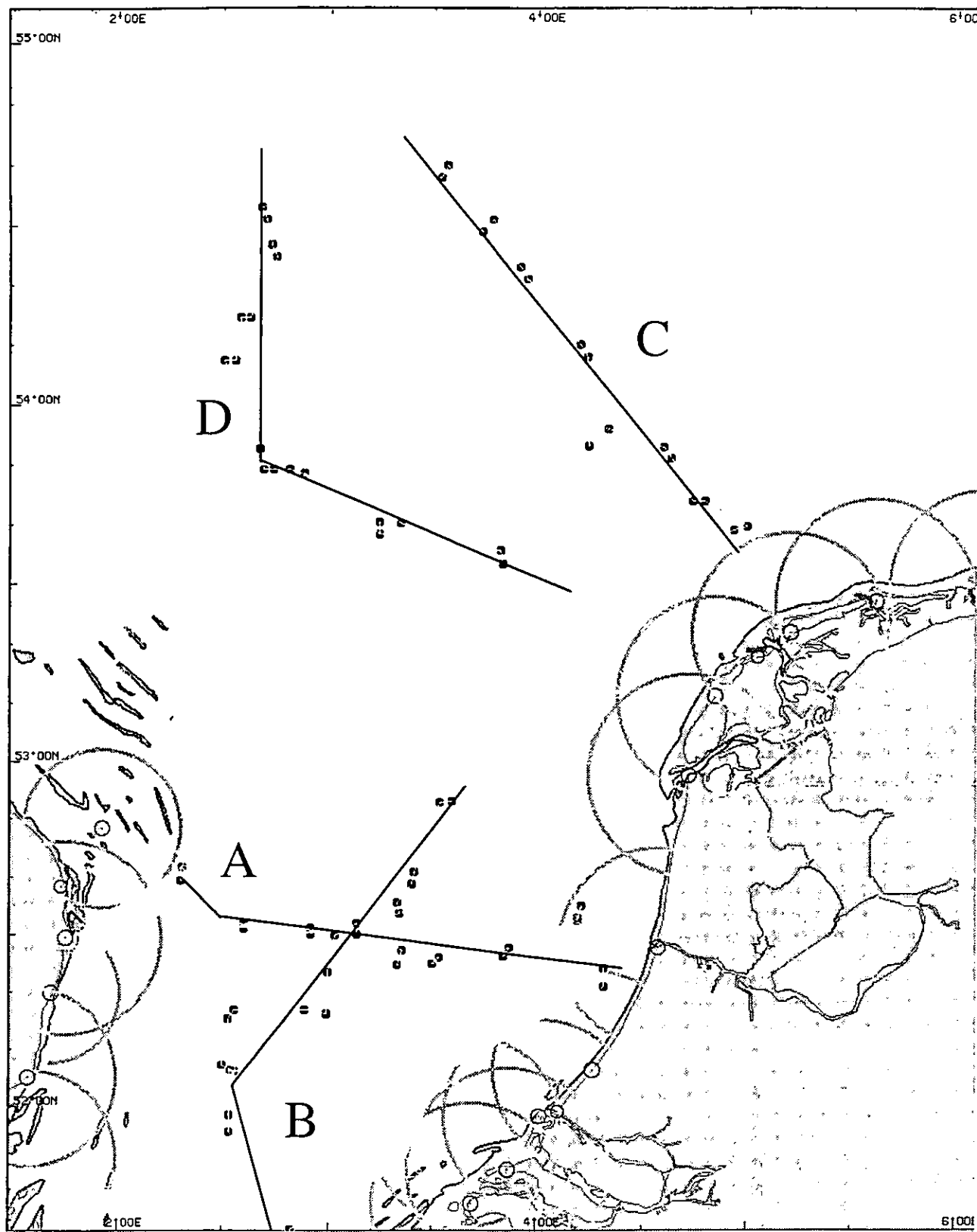


Fig. 2. Plaice spawning ground transects referred to in Table 2.

Corystes 1b/97: Catch per unit effort

clear tow					
position	males/h	females/h	stage V fems/h	immatures/h	
16	48.0	8.0	4.0	8.0	
17	123.2	9.2	4.8	5.6	
14	80.0	6.0	4.0	8.0	
18	90.0	14.0	4.0	12.0	
6	14.7	3.3	0.0	10.7	
24	8.2	1.8	0.0	6.4	
21	8.4	9.6	1.6	6.8	
10	46.0	10.0	6.0	20.0	
9	40.0	8.0	0.0	10.0	
13	46.0	10.0	0.0	10.0	
2	48.0	4.0	2.0	46.0	
27	9.5	3.5	0.0	17.0	
233N	6.0	5.0	0.0	81.0	
1N	40.0	28.0	4.0	100.0	
2N	10.0	7.5	2.5	22.0	
3N	43.0	6.0	2.0	23.0	
4N	62.0	6.0	4.0	14.0	
5N	20.0	6.0	2.0	10.0	
6N	10.5	3.5	1.0	2.5	
8N	15.0	5.0	2.0	7.5	
330N	9.5	3.5	1.0	0.5	
333N	23.0	16.0	3.0	5.0	
179N	34.0	10.0	4.0	10.0	
201N	12.0	8.4	4.2	4.2	
198N	12.6	5.4	0.6	13.8	

Table 1

Corystes 1b/97: Male plaice data

Area	Clear tow	Station(s)	Weight	Length	S.crit	Testes	Milt	GSI	n	Samples	Transect
1	16 S	63	222.30	28.35	45.20	3.15	1.98	2.28	n=20	1-20	A
2	17 S	65-67-68-69-70-71	202.42	26.80	44.38	2.95	1.73	2.19	n=100	21-120	A
3	14 S	73	159.10	25.35	51.42	2.03	1.33	2.05	n=20	121-140	A
4	18 S	77	136.60	24.15	44.35	1.77	1.08	2.08	n=20	141-160	A
5	6 S	78-79-80	99.20	21.35	47.37	1.22	0.73	1.85	n=20	161-180	A
6	24 S	85-86-87-88	127.17	23.50	49.41	1.50	0.87	1.84	n=18	181-198	B
7	21 S	91-92-93-94-95	190.05	26.60	51.53	2.92	1.34	2.02	n=20	201-220	B
8	10 S	98	202.75	27.20	47.60	2.77	1.47	2.17	n=20	221-240	B
9	9 S	99	185.50	26.35	45.10	2.40	1.60	1.97	n=20	241-260	B
10	13 S	105	122.65	23.25	47.30	1.47	1.13	2.08	n=20	261-280	B
11	2 S	107	130.60	23.85	43.95	1.53	1.23	2.10	n=20	281-300	B
12	27 S	110-111-112-113	128.68	23.53	47.84	1.43	0.85	1.71	n=19	301-319	B
13	233 N	114-115	86.00	20.50	54.00	1.05	0.63	1.91	n=6	321-326	C
14	1 N	118	175.30	26.30	46.15	1.95	1.27	1.82	n=20	331-350	C
15	2 N	119-120-121-122	155.70	24.80	46.32	1.77	1.26	1.94	n=20	351-370	C
16	3 N	124-125	187.80	26.20	49.20	2.02	1.54	1.93	n=20	371-390	C
17	4 N	127	213.15	27.60	44.30	3.07	1.88	2.11	n=20	391-410	C
18	5 N	129-130	193.95	26.50	35.70	1.87	1.25	1.61	n=20	411-430	C
19	6 N	132-134-135-136	352.30	32.80	41.50	5.06	2.92	2.11	n=20	431-450	C
20	8 N	138-139-140	289.95	30.15	40.80	4.62	2.59	2.16	n=20	451-470	C
21	330 N	145-146-147-148	282.95	30.74	40.32	3.63	2.25	2.01	n=19	471-489	D
22	333 N	150-151	197.70	27.10	43.65	2.19	1.99	2.04	n=20	491-510	D
23	179 N	154-155-156	201.26	27.32	43.93	2.04	1.87	1.77	n=20	511-529	D
24	201 N	160-161-162	183.00	26.60	44.10	1.75	1.63	1.69	n=20	531-550	D
25	198 N	164-165-166	162.35	25.55	45.20	1.72	1.13	1.83	n=20	551-570	D

Table 2

Corystes 1b/97: Plaice egg plankton collection

Corystes 1b 1997		Egg stage					Total	Total	All eggs egg/sq m sampled	Stage I eggs		egg/sq m total depth	egg/sq m total depth
Stn No.	Clear tow position	IA	IB	II	III	IV				V	Stage 1		
64	16	4		4				8	4	3.82	6.12	1.91	3.06
66	17	5		4		1		10	5	3.58	5.88	1.43	2.94
74	14	12	4	5		5	1	27	16	8.93	13.93	2.98	8.26
76	18	20	10	12	5	5	3	55	30	18.20	21.83	7.28	11.91
81	6	5	1	3	1			10	6	3.55	4.79	1.42	2.87
82	1		1					1	1	0.31	0.40	0.31	0.40
89	24	3		3				6	3	1.39	2.12	0.70	1.06
96	21							0	0	0.00	0.00	0.00	0.00
97	10	2	3	1	1	1		6	5	2.53	4.05	1.69	3.37
102	9	6	18	7		1		32	24	12.18	17.05	9.51	12.79
103	17	12	28	17	2	1		60	40	16.98	25.13	12.73	16.75
106	13	9	9	13	10	5	1	47	18	20.42	34.30	9.56	13.14
108	2	13	8	9	12	9	7	58	21	22.95	30.93	6.73	11.20
109	27			1	1	1		3	0	1.48	1.81	0.49	0.00
116	233N	6		1				7	6	3.07	3.93	0.44	3.37
117	1N	1						1	1	0.41	0.60	0.00	0.60
123	2N			1				1	0	0.41	0.68	0.41	0.00
126	3N	2	2	2				6	4	2.61	4.59	1.74	3.06
128	4N	7	10	3	1			21	17	7.72	15.44	4.78	12.50
131	5N	10	9	6	1	2		28	19	11.47	20.64	6.14	14.01
133	6N	8	10	9	3			30	18	11.03	19.85	6.98	11.91
141	8N	8	5	7	5			25	13	9.19	16.17	4.41	8.41
144	338N		1					1	1	0.44	0.55	0.44	0.55
149	330N	6	13	14	6	1		40	19	16.70	26.72	11.27	12.69
152	333N	5	5	6	7	3		26	10	11.18	29.52	4.73	11.35
155	179N	8	4	3	2	7		24	12	7.53	17.48	2.20	8.74
163	201N	10	9	2	7			28	19	11.05	18.56	4.34	12.59
167	198N							0	0	0.00	0.00	0.00	0.00

Table 3

Corystes 1b/97: Hydrographical data from the plankton sampler

Corystes 1b 1997											
Plaice egg catches											
Stn No.	Clear tow position	Water depth (m)	Depth sampled	Distance run Naut. mile	Duration Sec.	Internal Flow	External Flow	Salinity surface	Salinity bottom	Temp surface	Temp bottom
64	16	40	25	0.90	822	2358	2269	35.2	35.16	5.79	5.77
66	17	41	25	1.20	935	2512	2463	35.2	35.19	5.71	5.69
74	14	39	25	1.30	970	2663	2610	34.77	34.8	5.05	5.03
76	18	30	25	1.30	848	2453	2380	34.79	34.76	4.86	4.86
81	6	27	20	0.97	683	2098	1989	34.22	34.22	3.53	3.53
82	1	23	18	1.00	918	2411	2381	31.49	32.31	1.62	2.12
89	24	38	25	1.85	860	2606	2499	33.98	34.1	3.38	3.45
96	21	42	25	1.04	868	2433	2369	34.18	34.48	5.25	5.24
97	10	40	25	1.02	855	2433	2388	34.89	34.96	5.73	5.71
102	9	35	25	1.13	948	2414	2422	35.17	35.02	5.67	5.66
103	17	37	25	1.52	978	2816	2745	34.97	35.05	5.45	5.45
106	13	42	25	0.99	846	2181	2191	35.21	35.04	4.94	4.99
108	2	31	23	1.00	802	2265	2251	35	35.05	4.88	4.86
109	27	28	23	0.80	785	1687	1770	34.87	34.71	3.77	3.72
116	233N	32	25	0.98	873	2083	2140	33.6	33.79	3.1	3.17
117	1N	37	25	1.06	932	2488	2457	34.2	34.34	3.7	3.76
123	2N	41	25	1.04	1007	2549	2565	34.5	34.55	4.81	4.62
126	3N	44	25	0.99	851	2271	2259	34.49	34.57	4.87	4.7
128	4N	50	25	1.17	945	2912	2841	34.63	34.56	5.72	5.73
131	5N	45	25	1.05	901	2591	2532	34.38	34.45	5.45	5.45
133	6N	45	25	1.17	925	2878	2772	34.46	34.48	5.5	5.5
141	8N	44	25	1.17	977	2670	2629	34.4	34.42	5.51	5.51
144	338N	29	23	0.90	905	2301	2271	34.39	34.43	5.44	5.47
149	330N	40	25	1.03	944	2539	2535	34.46	34.45	5.56	5.52
152	333N	66	25	1.00	880	2584	2567	34.33	34.4	5.5	5.5
155	179N	58	25	1.37	1138	3098	3123	34.39	34.44	5.12	5.05
163	201N	42	25	1.09	1066	3109	3091	34.37	34.34	4.77	4.57
167	198N	33	25	1.12	967	2482	2513	33.86	33.85	3.66	3.68

Table 4